Dirk Beyer
Damien Zufferey (Eds.)

Verification, Model Checking, and Abstract Interpretation

21st International Conference, VMCAI 2020
New Orleans, LA, USA, January 16–21, 2020
Proceedings

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Preface

Welcome to VMCAI 2020, the 21st International Conference on Verification, Model Checking, and Abstract Interpretation. VMCAI 2020 is part of the 47th ACM SIGPLAN Symposium on Principles of Programming Languages (POPL 2020), at the hotel JW Marriott New Orleans, USA, during January 19–21, 2020.

Conference Description. VMCAI provides a forum for researchers from the communities of verification, model checking, and abstract interpretation, facilitating interaction, cross-fertilization, and advancement of hybrid methods that combine these and related areas. The topics of the conference include program verification, model checking, abstract interpretation, program synthesis, static analysis, type systems, deductive methods, decision procedures, theorem proving, program certification, debugging techniques, program transformation, optimization, and hybrid and cyber-physical systems.

Focus on Reproducibility of Research Results. VMCAI 2020 included, for the first time in this conference series, an optional artifact-evaluation (AE) process for submitted papers. Reproducibility of results is of the utmost importance to the VMCAI community. Therefore, we encouraged all authors to submit an artifact for evaluation. An artifact is any additional material (software, data sets, machine-checkable proofs, etc.) that substantiates the claims made in a paper and ideally makes them fully replicable. The evaluation and archival of artifacts improves replicability and traceability for the benefit of future research and the broader VMCAI community.

Paper Selection. VMCAI 2020 received a total of 44 paper submissions. After a rigorous review process, with each paper reviewed by at least 3 Program Committee (PC) members, followed by an online discussion, the PC accepted 21 full papers for publication in the proceedings and presentation at the conference. The main selection criteria were quality, relevance, and originality.

Invited Talks. The conference program includes three keynotes, by Rajeev Alur (University of Pennsylvania, USA) on "Model Checking for Safe Autonomy," Marta Kwiatkowska (University of Oxford, UK) on "Safety and Robustness for Deep Learning with Provable Guarantees," and Moshe Vardi (Rice University, USA) on "The Siren Song of Temporal Synthesis."

Winter School. The VMCAI Winter School is the second winter school on formal methods, associated with VMCAI 2020, New Orleans, USA, during January 16–18, 2020. In the vein of VMCAI, the school is meant to facilitate interaction, cross-fertilization, and advancement of hybrid methods that combine verification, model checking, and abstract interpretation. The school is aimed primarily at PhD students who intend to continue their study in the field of verification.

The VMCAI Winter School program features lectures and tutorials from both academia and industry experts in their respective fields. The school covers several fundamental aspects of formal methods and applications. The following speakers were invited

to give lectures at the winter school: Dirk Beyer (Ludwig-Maximilians-Universität München, Germany), Igor Konnov (Interchain Foundation, Switzerland), Marta Kwiatkowska (University of Oxford, UK), Corina Pasareanu (NASA Ames and Carnegie Mellon University, USA), Andreas Podelski (University of Freiburg, Germany), Natasha Sharygina (University of Lugano, Switzerland), Helmut Seidl (TU Munich, Germany), Moshe Vardi (Rice University, USA), Mike Whalen (Amazon Web Services, USA), and Valentin Wüstholz (Consensys Diligence, Germany).

The venue of the second VMCAI Winter School is the New Orleans BioInnovation Center. The school location and schedule was chosen to integrate nicely with POPL and VMCAI, New Orleans, USA, during January 19–25, 2020. The registration for the winter school was free but mandatory. As part of the registration, the applicants could apply for travel and accommodation support, which we were able to provide thanks to the generous donations of the sponsors. Furthermore, we helped to find room mates to reduce the accommodation cost. Students with alternative sources of funding were also welcome.

Artifact-Evaluation Process. For the first time, VMCAI 2020 used an AE process. The goals of AE are: (1) getting more substantial evidence for the claims in the papers, (2) simplify the replication of results in the paper, and (3) reward authors who create artifacts. Artifacts are any additional material that substantiates the claims made in the paper. Examples for artifacts are software, tools, frameworks, data sets, test suites, and machine-checkable proofs.

Authors of submitted papers were encouraged to submit an artifact to the VMCAI 2020 Artifact-Evaluation Committee (AEC). We also encouraged the authors to make their artifacts publicly and permanently available. Artifacts had to be provided as .zip files and contain all necessary software for AE as well as a README file that describes the artifact and provides instructions on how to replicate the results. AE had to be possible in the VMCAI 2020 virtual machine, which runs an Ubuntu 19.04 with Linux 5.0.0-31 and was made publicly and permanently available on Zenodo[1].

All submitted artifacts were evaluated in parallel with the papers, and a meta-review of the AE was provided to the reviewers of the respective papers. We assigned three members of the AEC to each artifact and assessed it in two phases. First, the reviewers tested if the artifacts were working, e.g., no corrupted or missing files exist and the evaluation does not crash on simple examples. 5 of the 15 submitted artifacts passed the first phase without any problems and we skipped the author clarification phase for them. For the remaining 10 artifacts, we sent the issues of reviewers to the authors. The authors' answers to the reviewers were distributed among the reviewers, and the authors were allowed to submit an updated artifact to fix issues found during the test phase. In the second phase, the assessment phase, the reviewers aimed at replicating any experiments or activities and evaluated the artifact based on the following five questions:

1. Is the artifact consistent with the paper and the claims made by the paper?
2. Are the results of the paper replicable through the artifact?
3. Is the artifact complete, i.e., how many of the results of the paper are replicable?

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[1] https://doi.org/10.5281/zenodo.3533104

4. Is the artifact well-documented?
5. Is the artifact easy to use?

10 of the 15 submitted artifacts passed this second phase and were rewarded with the 'Functional' VMCAI AE badge. Independently, artifacts that are permanently and publicly available were rewarded with the 'Available' VMCAI AE badge. 6 artifacts received this 'Available' badge.

The VMCAI 2020 AEC consisted of the two chairs, Daniel Dietsch and Marie-Christine Jakobs, and 20 committee members from 9 different countries.

December 2019

Dirk Beyer
Damien Zufferey
PC Chairs

Daniel Dietsch
Marie-Christine Jakobs
AEC Chairs

Organization

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